ROUTING AND RECORD SHEET

SUBJECT: (Optional) Technological Surprise -- STAP Working Group Report

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FROM: Chairman, STAP

EXTENSION

NO. STAP 88-0004

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DATE 3 Febraury 1988

TO: (Officer designation, room number, and building)	DATE RECEIVED	DATE FORWARDED	OFFICER'S INITIALS	COMMENTS (Number each comment to show from whom to whom. Draw a line across column after each comment.)
1. Executive Registry	10 FEB 1988			DCI - This is a very good memo. When you have read it we should talk about follow up. Bob.
2. DDCI		12 Feb		
3. DCI signed	12 Feb.			
4.				
5. DDCI				
6.				
7.				WSSIC NIO
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5. ICS/PPO		

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REMARKS

This is ok as far as it goes. But who in the real world will implement all of this & watch over it & report on problems? The criticisms of the CSPC apply here in part — our goal should be to actually do something. D.

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STAP [redacted] 25X1

Director of Central Intelligence
Science & Technology Advisory Panel

10 August 1988

NOTE FOR: Dr. Julian C. Nall
NIO/S&T

FROM: [redacted] 25X1
Executive Secretary

SUBJECT: Technology Surprise Report

As we discussed on the telephone, attached is the report cover sheet with the DDCI's comments. It does not appear that the DCI signed off on the report; he may not have seen it. I have also attached a copy of the report itself in case your files have been purged. [redacted] 25X1

Attachment:
STAP 88-0004

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CONTAINS S/[redacted] INFORMATION--
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REMOVAL OF ATTACHMENT

[redacted] 25X1

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DIRECTOR OF CENTRAL INTELLIGENCE

Science and Technology Advisory Panel

STAP 88-0004
3 February 1988

MEMORANDUM FOR: Director of Central Intelligence

VIA: Deputy Director of Central Intelligence
Director, Intelligence Community Staff

SUBJECT: Technological Surprise - STAP Working Group Report [redacted] 25X1

1. Purpose This memorandum reports the findings of a STAP working group [redacted] that examined the question of how intelligence could be enhanced to reduce the likelihood of technological surprise, with particular emphasis on the Soviet Union. After defining the kinds of surprise that can occur, the working group followed two main lines of inquiry: a review of the organizational structure and process the Intelligence Community uses to study technological issues; and an examination of some key substantive areas that are likely to see technological advances. The findings of the group are summarized in this report. A detailed list of procedural recommendations (Attachment A) and a survey of substantive areas for emphasis (Attachment B) are attached. [redacted] 25X1 25X1

2. Kinds of Surprise Because of its dramatic effect in combat, we are usually inclined to conceive of surprise in the sense suggested by the Trojan Horse or Pearl Harbor, a sense that limits our perspective to an immediate cause and effect. But it is no less essential to examine surprise in a broader context, to look at the means as well as the conduct of warfare. Innovations in military technology--such as the longbow, gunpowder, the machine gun, the long-range missile, and so on--have changed the face of warfare and the political map. The history of these innovations illustrates a range of development paths, and underscores the important point that there is no single way of thinking about surprise. Analysts must be aware of the diversity of routes by which surprise can occur. [redacted] 25X1

a. Scientific Surprise Surprise here most nearly equates to scientific notions of "discovery." Most dramatic would be the unilateral discovery of a new scientific principle, like nuclear fission or stimulated emission, whose military applications would be held secret until a surprise attack--an unlikely event. Given the broad reach of science, it is difficult to predict a comprehensive range of areas that could prove troubling. [redacted] 25X1

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SUBJECT: Technological Surprise - STAP Working Group Report

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b. Technological Innovation Equally high stakes, at somewhat higher probability, are associated with the technological development or novel combination of established scientific principles for military uses. At issue are both the exploitation of new scientific principles and the integration of different technologies in unanticipated ways. For example, the fission of atomic nuclei by neutron capture was a publicly available scientific fact just before World War II. The program to develop the technology for a feasibility demonstration of a nuclear weapon was not (although it was later acquired by Soviet espionage).

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d. Fielding of New Military Systems Many divergences between the US and the Soviets in this category are already known, but their significance may not yet be fully appreciated; others remain to be identified. In organizing efforts to avert surprise, it will be important to focus careful attention on identifying potential countermeasures to our existing systems. In many cases we are well aware of the technologies that might be applicable

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and we are attempting to avoid

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surprise by preparing for the possibility that our adversaries have expended the effort to deploy them. Technological surprise in this vein can also be compounded by innovations in doctrine and tactics; again, the main surprise would be that an adversary actually did what we knew (technically) to be possible.

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3. It is also important to emphasize the point that surprise has a political dimension. During a period of cold war, for example, the political impact of a surprise (as with Sputnik in 1957) merges with military leverage

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as an important area of concern. An emerging concern should be noted in this category--the potential for application of more sophisticated technologies by terrorist groups. A final consideration that may tend to confound our ability to predict technological advances is the part played by Soviet espionage efforts, especially those directed at covert acquisition of technology and technical information. As we have seen, system development times can be significantly shortened by such methods. [redacted]

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4. Responding to the Possibility of Surprise A program to anticipate and avert technological surprise should have several dimensions because of the various forms that surprise may take. What follows is a survey of conceptual and organizational steps that would enhance the intelligence effort. The strategy behind the recommendations has three parts: [redacted]

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[redacted]

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- Increase awareness, emphasis, and continuity within the Intelligence Community on technological surprise considerations.

- Improve contact and communication between the Intelligence Community and policymakers to enhance prospects for early action to counter potential surprises and to identify areas where surprises may be particularly worrisome. This is especially relevant to military applications of technology and the fielding of new military systems [redacted]

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a. Conceptual Recommendations

(1) Review of US R&D efforts We would do well to review, systematically, US military technology development programs, including proposals for development that have not been pursued. (This approach will require a high standard of cooperation between intelligence and DoD and Service Research and Development organizations, especially with respect to highly classified programs, which will raise difficult questions of access.) Technology application programs should be reviewed to determine:

- Their potential in some circumstances to do us serious harm were they successfully developed by the Soviets.

- The Soviet technological capacity to undertake the necessary development, acquisition, and deployment.

- An intelligence assessment of the real and potential indicators of their current status in the USSR.

[redacted]

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We should also scan our vulnerabilities with these same questions in mind, particularly with respect to potential countermeasures to currently programmed US systems

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Beyond this, it will be important to have a small, highly creative effort to identify technological innovations that, though clearly inappropriate for the US, might be rewarding for the USSR.

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(2) Doctrinal, Socio-political and Geomilitary Dimensions. The use of high technology in warfare could produce disastrous surprises if we rely on constraints that may be of a political rather than a technical nature, for example, disarmament treaties, non-proliferation agreements, or expectations of a country's intentions.

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Technology developed in third countries (not just the US and USSR) should not be neglected, and attention should be paid to the fact that surprise implications are not limited to military issues; economic implications are also important (as in the case, for example, of fusion).

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It is not enough, however, to grasp the potential for surprise; it is as important to increase the awareness of those who must act on that potential. A list of recommendations that would accomplish these objectives at very little cost is shown in Attachment A.

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5. Substantive Areas Where Surprises May Occur Although implementation of the above recommendations is believed to be the most important action needed to reduce the chance that another Sputnik, ALFA-class submarine, or mycotoxin biological agent will take US policymakers unaware, the Panel believes it would also be useful to identify key areas where intelligence attention should be concentrated. These areas include technological opportunities that may be exploited in ways that would have significance for

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military capabilities, the civilian economy or its institutions, public perception, or political relations in the next 10-20 years. Most scientific or technical intelligence analysts either are aware of these opportunities or are likely to become so within a few years. The Panel's purpose is to heighten those analysts' awareness of the possible implications and sensitize them to activities in the identified fields earlier than might otherwise occur.

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6. The specific areas and their extrapolations were selected as a result of interviews with leading scientists and engineers, active in research, development, or management. Those interviewed were not constrained to limit their ideas to their own fields of activity or expertise. They were, however, asked to think in terms of reduction to application within the next 10-20 years. Would it be reasonable, for example, to believe that builders and users could plan, design, and construct systems or components incorporating the technology in question with a fair degree of confidence in availability and reliability?

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7. In several instances, the question is not one of developing and applying a new technology, but rather applying an existing technology either in an innovative way--not previously seen or thought likely or feasible, or in a well understood manner--to achieve a goal not previously attained. Again, in some cases, it is not a new technology but the ramifications of extensive application of an existing technology which has been illuminated. Although not the exclusive target, the USSR was clearly the country of primary concern for matters of political or military import.

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8. A list of some of the technologies that the working group believes should bear increased scrutiny is attached (Attachment B). Others will occur to the reader or will be derived from the procedural suggestions noted above. These are included simply to initiate the necessary thought-process. The main application areas are in:

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9. As an aside it is worth pointing out that one knowledgeable observer of the Soviet political and scientific scene suggested that despite apparent changes in atmosphere in the USSR, including the stress on "glasnost", activities in R&D institutions will not change much in the foreseeable future. There will be younger institute directors, and some relaxation of

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constraints on communication, but most things, including the areas being worked, will go on as before.

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10. We intend to continue working closely with Community S&T officers to reduce the likelihood of surprise, and would be happy to discuss any of these issues with you in further detail if you wish.

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Attachments:

A. Procedural Recommendations

B. Some Technologies and Substantive Areas for Emphasis

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